



**Comparison of API Specifications, Grant Prideco H-Series
And Grant Prideco H-Series PLUS Specifications
For Drill Pipe Components and Assemblies**

API Requirements

Tool Joints	
Yield Strength	120,000 psi minimum
Tensile Strength	140,000 psi minimum
Hardness	285 BHN minimum
Refacing Benchmark	API Bar with circle
Drill Pipe	
Wall Thickness	87 ½% of API nominal
Assembly	
Weld Zone Impact Strength (Charpy)	10 ft. lbs avg., 12 min @ 70 F

H-Series Requirements (All of the above, *plus*)

Tool Joints	
Heat Treatment	Quench and Temper
Hardness	293-331 BHN
Impact Strength, Charpy V-Notch	35 min. 41 avg 72 F
Mechanical Test Frequency	1/heat/heat treat lot box and pin
Refacing Benchmark	H-Series
Non Destructive Flaw Detection	MPI transverse and longitudinal
Microstructure Evaluation	Same frequency as Testing
Drill Pipe	
Internal Upset Transition	4" min. length, 8" min. radius
Assembly	
Weld Method	Inertia or Friction
Weld Zone Heat Treatment	Quench and Tempered
Weld Zone Safety Factor	1.1:1
Marking	Serial Number on finished assembly traceable to heat numbers of components
Finishing	50% zinc thread compound. Pressed Steel Thread Protectors Black Paint with White Stencils

H-Series PLUS Requirements (all of the above, *plus*)

Tool Joints

Impact Strength, Charpy V-Notch
Mechanical Test Frequency (SR)
Make and Break
Cold Roll Threads

41 ft. lbs. min., 52 avg. @ -4 F
1/100/heat treat lot, box and pin
3 times at 60% torsional yield

Drill Pipe

Wall Thickness
Joint length (Range 2)
Tube Inspection
Impact Strength (Charpy $\frac{3}{4}$ size)
Traceability

Mechanical Test Frequency (SR)

95% of API nominal
28'6" to 30'0" prior to assembly
Full Length EMI and UT
49 ft lbs min, 58 avg. @ -4 F
Sequence number traceable to
heat treatment
1 joint/100/heat treat lot

Assembly

Weld Zone Impact Requirement
Weld Zone Testing Frequency
Demagnetization

24 ft. lbs min, 31 avg. @ -4 F
1 weld/100 welds/welder
Full Length Demagnetization